**Claims**

What is claimed is:

1. Apparatus for performing infinite impulse response filtering, the apparatus comprising:

a first infinite impulse response filtering stage, the first filtering stage including one or more storage elements, the one or more storage elements being operative to store, in accordance with the filtering of a current input sample, one or more feedback state values associated with one or more input samples which precede the current input sample; and

at least a second infinite impulse response filtering stage, the second filtering stage being operatively coupled to the first filtering stage and including one or more storage elements, the one or more storage elements being operative to store, in accordance with the filtering of the current input sample, one or more feedback state values associated with one or more input samples which precede the current input sample; and

an intermediate storage element, the intermediate storage element being operatively coupled between the first filtering stage and the second filtering stage and operative to store, in accordance with the filtering of the current input sample, a partial state value useable to update at least one feedback state value associated with the second filtering stage for the filtering of a next input sample, the partial state value being a function of at least one feedback state value associated with the current input sample and the input sample preceding the current input sample.

2. The apparatus of claim 1, wherein the first filtering stage comprises:

a first storage element, the first storage element being operative to store, in accordance with the current input sample, a feedback state value associated with an input sample which precedes the current input sample; and

at least a second storage element, the second storage element being operative to store, in accordance with the current input sample, a feedback state value associated with an input sample which precedes the input sample preceding the current input sample.

3. The apparatus of claim 2, wherein the second filtering stage comprises:

a first storage element, the first storage element being operative to store, in accordance with the current input sample, a feedback state value associated with an input sample which precedes the current input sample; and

at least a second storage element, the second storage element being operative to store, in accordance with the current input sample, a feedback state value associated with an input sample which precedes the input sample preceding the current input sample.

4. The apparatus of claim 3, wherein the partial state value to be stored in the intermediate storage element is useable to update the feedback state value associated with the first storage element of the second filtering stage.

5. The apparatus of claim 3, wherein the partial state value to be stored in the intermediate storage element is a function of the feedback state values associated with the first and second storage elements of the first filtering stage and the second storage element of the second filtering stage.

6. The apparatus of claim 3, wherein the partial state value associated with the intermediate storage element enables the update of the feedback state value associated with the first storage element of the second filtering stage no more than one cycle after the availability of preceding feedback state value updates associated with the first filtering stage.

7. The apparatus of claim 1, wherein the storage elements are implemented in accordance with a digital signal processor.

8. The apparatus of claim 7, wherein the digital signal processor is a very long instruction word type digital signal processor.

9. The apparatus of claim 1, wherein the storage elements are implemented in accordance with an integrated circuit.

10. A method of performing infinite impulse response filtering, the method comprising the steps of:

storing one or more feedback state values associated with one or more input samples which precede a current input sample in one or more storage elements of a first infinite impulse response filtering stage;

storing one or more feedback state values associated with one or more input samples which precede the current input sample in one or more storage elements of a second infinite impulse response filtering stage;

storing a partial state value in an intermediate storage element operatively coupled between the first filtering stage and the second filtering stage, the partial state value being a function of at least one feedback state value associated with the current input sample and the input sample preceding the current input sample; and

using the partial state value to update at least one feedback state value associated with the second filtering stage for the filtering of a next input sample.

11. The method of claim 10, wherein the first filtering stage comprises:

a first storage element, the first storage element being operative to store, in accordance with the current input sample, a feedback state value associated with an input sample which precedes the current input sample; and

at least a second storage element, the second storage element being operative to store, in accordance with the current input sample, a feedback state value associated with an input sample which precedes the input sample preceding the current input sample.

12. The method of claim 11, wherein the second filtering stage comprises:

a first storage element, the first storage element being operative to store, in accordance with the current input sample, a feedback state value associated with an input sample which precedes the current input sample; and

at least a second storage element, the second storage element being operative to store, in accordance with the current input sample, a feedback state value associated with an input sample which precedes the input sample preceding the current input sample.

13. The method of claim 12, wherein the partial state value to be stored in the intermediate storage element is used to update the feedback state value associated with the first storage element of the second filtering stage.

14. The method of claim 12, wherein the partial state value being stored in the intermediate storage element is a function the feedback state values associated with the first and second storage elements of the first filtering stage and the second storage element of the second filtering stage.

15. The method of claim 12, wherein the storing of the partial state value enables the update of the feedback state value associated with the first storage element of the second filtering stage no more than one cycle after the availability of preceding feedback state value updates associated with the first filtering stage.

16. The method of claim 10, wherein the storage elements are implemented in accordance with a digital signal processor.

17. The method of claim 16, wherein the digital signal processor is a very long instruction word type digital signal processor.

18. The method of claim 10, wherein the storage elements are implemented in accordance with an integrated circuit.

19. A digital signal processor-implemented cascaded biquad infinite impulse response filter, the filter comprising:

a first infinite impulse response filtering stage, the first filtering stage including:

a first storage element, the first storage element being operative to store, in accordance with the filtering of a current input sample, a feedback state value associated with an input sample which precedes the current input sample; and

at least a second storage element, the second storage element being operative to store, in accordance with the filtering of the current input sample, a feedback state value associated with an input sample which precedes the input sample preceding the current input sample

at least a second infinite impulse response filtering stage, the second filtering stage being operatively coupled to the first filtering stage and including:

a first storage element, the first storage element being operative to store, in accordance with the filtering of the current input sample, a feedback state value associated with an input sample which precedes the current input sample; and

at least a second storage element, the second storage element being operative to store, in accordance with the filtering of the current input sample, a feedback state value associated with an input sample which precedes the input sample preceding the current input sample; and

an intermediate storage element, the intermediate storage element being operatively coupled between the first filtering stage and the second filtering stage and operative to store, in accordance with the filtering of the current input sample, a partial state value useable to update the feedback state value associated with the first storage element of the second filtering stage for the filtering of a next input sample, the partial state value being a function of the feedback state values associated with the first and second storage elements of the first filtering stage and the second storage element of the second filtering stage.

20. The filter of claim 19, wherein the partial state value associated with the intermediate storage element enables the update of the feedback state value associated with the first storage element of the second filtering stage no more than one cycle after the availability of preceding feedback state value updates associated with the first filtering stage.